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MEMORANDUM FOR PR (Contractor/In-House Publication)

FROM: PROI (TI) (STINFO)

04 Dec 2000

SUBJECT: Authorization for Release of Technical Information, Control Number: **AFRL-PR-ED-AB-2000-230**
Wassom, S.R. (Thiokol); Farmer, G.D. (SRS); Holmes, Michael R, "Solar Thermal Propulsion IHPRPT
Demonstration Program Results"

37th AIAA/ASME/SAE/ASEE Joint Propulsion Conference (Statement A)
(Salt Lake City, UT, 8-11 Jul 2001) (Deadline for Abstract: 08 Nov 00 - Extended)

1. This request has been reviewed by the Foreign Disclosure Office for: a.) appropriateness of distribution statement, b.) military/national critical technology, c.) export controls or distribution restrictions, d.) appropriateness for release to a foreign nation, and e.) technical sensitivity and/or economic sensitivity.

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PHILIP A. KESSEL Date
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Solar Thermal Propulsion IHPRPT Demonstration Program Results

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Abstract

Spacecraft powered by solar thermal propulsion engines will be able to provide the velocity change required to economically maneuver large payloads from one orbit to another or to perform interplanetary missions. This innovative concept, when applied, will double the efficiency of currently used LH2 - LO2 chemical upper stages. Solar thermal propulsion uses the sun's energy to heat a low molecular weight working fluid such as hydrogen to very high temperatures (3,000K). The stored thermal energy is then converted to kinetic energy as the working fluid exits a diverging nozzle.

Under Integrated High Payoff Rocket Propulsion Technology (IHPRPT) funding, the Air Force Research Lab (AFRL) has sponsored the team of Thiokol Propulsion and SRS Technologies to demonstrate the technological readiness and performance of an inflatable solar thermal propulsion system. This paper will address the results of this program, which includes the fabrication and thermal vacuum testing of a 4 X 6 meter inflatable flight quality solar concentrator. The program culminates in a full-up integrated proof-of-concept ground test of a direct gain solar thermal propulsion system. The results of this test will be reported. These tests will demonstrate that the technology is ready for development of flight hardware for Solar Orbital Transfer Vehicles.

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